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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/674,926

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EXAMINER

BRADLEY, MATTHEW A

ART UNIT

PAPER NUMBER

2187

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/674,926	Applicant(s) OLSEN ET AL.	
	Examiner Matthew Bradley	Art Unit 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office Action has been issued in response to amendment filed 13 April 2006. Applicant's arguments have been carefully and fully considered but are moot in view of the new ground(s) of rejection as necessitated by amendment. Accordingly, this action has been made FINAL.

Claim Status

Claims 1-19 remain pending and are ready for examination.

Claim Objections

Claims 17 and 18 are objected to because of the following informalities:

- As amended, claims 17 and 18 recite 'storing storing'.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-6, 9-10, and 13-19**, are rejected under 35 U.S.C. 102(b) as being anticipated by Kimura et al (U.S. 6,415,359) hereinafter referred to as Kimura.

As per independent claim **1**, Kimura teach,

- first and second of levels of a non-volatile storage hierarchy, (Column 3 line 55 to Column 4 line 15). *The Examiner notes that the system of*

Kimura teach a disk device (first level of non-volatile storage) and a cache of the disk device (second level of non-volatile storage).

- wherein accessing information in the first level consumes more energy than accessing information in the second level; and (Column 3 lines 47-54 as taught in the abstract). *The Examiner notes that the abstract of Kimura teaches a first memory for storing files and a second memory for storing a plurality of files and having a much higher capacity. The naming of the first and second memories is different when read with respect to the citing made supra. However, the Examiner wishes to point out, that as per the abstract, the disk device is taught as second memory and the cache is taught as the first memory. Further, consistent with the teachings of Kimura, the disk device consumes more energy than the cache.*
- a processor for storing only strategically selected storage data in to the second level of non-volatile storage based on energy-conserving criteria (Column 4 lines 16-25 and as taught in the abstract).

As per dependent claim 2, Kimura teach, wherein the energy-conserving criteria comprise a collection of heuristics (Column 4 lines 57-67)

As per dependent claim 3, Kimura teach, wherein the energy-conserving criteria comprise system state information (Column 4 lines 57-67). *The Examiner notes that system state information as instantly claimed, is taught by Kimura as a state when the system is on AC power or battery power.*

As per dependent claim 4, Kimura teach, wherein the system comprises a storage input/output subsystem and system state information comprises whether the storage input/output subsystem is using one or more specific files (Column 5 lines 36-49).

As per dependent claim 5, Kimura teach, wherein the system state information comprises at least one factor from among the following factors:

- the storage input/output associated with one or more predetermined software applications; (Column 6 lines 31-49)
- a sequence of storage input/output operations; (Column 10 lines 45-51)
- observed interactions with the first level of the storage hierarchy and wherein the collection of heuristics infer the state of the second level of the storage hierarchy; and (Column 9 lines 37-39)
- a type of energy source powering the system (Column 5 lines 50-61).

As per dependent claim 6, Kimura teach, further comprising a power source for the system and wherein the system state information comprises information identifying the amount of energy left in the power source when the system is disconnected from other sources of energy (Column 5 lines 50-53).

As per dependent claim 9, Kimura teach, wherein the system state information comprises at least one factor from among the following factors: the storage input/output data associated with the characteristics of the connection between the first and second levels of the storage hierarchy; the storage input/output data associated with characteristics of the connection between the system and at least one second level of

the storage hierarchy; the proximity of the storage input/output to events that change the state of the at least one first level of the storage hierarchy; the proximity of the storage input/output to a previous interaction with at least one first level of storage hierarchy; an indication of a hard-disk drive spin-down event; and physical characteristics of the second levels of the storage hierarchy (Column 4 lines 4-15).

As per dependent claim **10**, Kimura teach, wherein the system state information comprises physical characteristics of the second levels of the storage hierarchy (Column 4 lines 4-15). *The Examiner notes that the status of the hard disk cache as taught by Ryu is a characteristic of the second level of the storage hierarchy as claimed instantly.*

As per dependent claim **13**, Kimura teach, wherein the processor is for removing information from the second level of storage based on energy-conserving criteria (Column 4 lines 16-20).

As per dependent claim **14**, Kimura teach, wherein writing information to the second level of storage further comprises: a mapping schema between cache files in the second level of storage and disk files in the first level of storage, wherein each cache file is named with a logical cluster number of its corresponding disk file (Column 7 lines 31-45).

As per dependent claim **15**, Kimura teach,

- comprising a hard disk drive comprising rotating magnetic media comprising the first level storage and a cache comprising the second level storage and (Column 3 line 55 to Column 4 line 15). *The Examiner notes*

that the system of Kimura teach a disk device (first level of non-volatile storage) and a cache of the disk device (second level of non-volatile storage).

- an application-specific integrated circuit for managing the cache according to the energy-conserving criteria (Column 3 lines 41-54).

As per independent claim **16**, Kimura teach,

- first level non-volatile storage for storing information; second level non-volatile storage for storing information according to a set of energy-saving criteria; (Column 3 line 55 to Column 4 line 15). *The Examiner notes that the system of Kimura teach a disk device (first level of non-volatile storage) and a cache of the disk device (second level of non-volatile storage).*
- a battery level detector for determining the level of charge in a battery; (Column 16 lines 55-60).
- and a controller for storing only strategically selected storage data in the second level of storage when the battery level detector determines that the battery charge is below a pre-determined threshold of charge. (Column 4 lines 16-25 and as taught in the abstract).

As per independent claim **17**, Kimura teach,

- two levels of non-volatile storage wherein a first level is managed and a second level is unmanaged (Column 3 line 55 to Column 4 line 15). *The Examiner notes that the system of Kimura teach a disk device (first level*

of non-volatile storage) and a cache of the disk device (second level of non-volatile storage).

- wherein storing information in managed storage consumes less system resources than storing information in unmanaged storage, the method comprising: (Column 3 lines 47-54 as taught in the abstract). *The Examiner notes that the abstract of Kimura teaches a first memory for storing files and a second memory for storing a plurality of files and having a much higher capacity. The naming of the first and second memories is different when read with respect to the citing made supra. However, the Examiner wishes to point out, that as per the abstract, the disk device is taught as second memory and the cache is taught as the first memory. Further, consistent with the teachings of Kimura, the disk device consumes more energy than the cache.*
- monitoring the system to determine whether the operating state of the system satisfies one or more energy-conserving criteria; and (Column 5 lines 50-53)
- storing storing only strategically selected storage data in managed storage when the operating state of the system satisfies one or more energy-conserving criteria (Column 4 lines 16-25 and as taught in the abstract).

As per independent claim **18**, Kimura teach,

- a computer readable medium comprising program instructions for:
(Column 19 lines 10-19).

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- monitoring a system to determine whether the operating state of the system satisfies one or more energy-conserving criteria; and (Column 5 lines 50-53)
- storing storing only strategically selected storage data in managed non-volatile storage when the operating state of the system satisfies one or more energy-conserving criteria. (Column 4 lines 16-25 and as taught in the abstract).

As per independent claim **19**, Kimura teach,

- first and second levels of non-volatile storage, (Column 3 line 55 to Column 4 line 15). *The Examiner notes that the system of Kimura teach a disk device (first level of non-volatile storage) and a cache of the disk device (second level of non-volatile storage).*
- wherein accessing the first level of storage uses more energy than accessing the second level of storage; (Column 3 lines 47-54 as taught in the abstract). *The Examiner notes that the abstract of Kimura teaches a first memory for storing files and a second memory for storing a plurality of files and having a much higher capacity. The naming of the first and second memories is different when read with respect to the citing made supra. However, the Examiner wishes to point out, that as per the abstract, the disk device is taught as second memory and the cache is taught as the first memory. Further, consistent with the teachings of Kimura, the disk device consumes more energy than the cache.*

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- an energy use detector for determining the level of energy being used by the system; and (Column 4 lines 57-67)
- an arbiter for storing only strategically selected storage data in second level storage when the energy use detector determines that the system is being powered by a battery (Column 4 lines 16-25 and as taught in the abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being obvious over Kimura in view of Thelander et al. (U.S. 2003/0009705) hereinafter referred to as Thelander.

As per dependent claim 7, Kimura teach the limitations of dependent claim 3 and independent claim 1 for which dependent claim 7 depends upon.

Kimura is silent however on, the system stores current user profiles and the system state information comprises whether storage input/output data are associated with a current user profile.

Thelander, the system stores current user profiles and the system state information comprises whether storage input/output data are associated with a current user profile (Paragraph 48).

Kimura and Thelander are analogous art because they are from the same field of endeavor, namely power management in computing systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, having both the teachings of Kimura and Thelander before him/her, to implement the power management profiles of Thelander into the system of Kimura to exploit the benefit of multiple power profiles based on a user's preferences.

The motivation for doing so would have been that, the power management profile may include multiple power settings or power schemes with the same schedule, so that the user may select between different power settings or schemes to be implemented (Paragraph 48).

Therefore it would have been obvious to combine Kimura with Thelander to exploit the benefit of multiple power profiles based on a user's preferences to obtain the invention as specified in claims 7 and 8.

As per dependent claim 8, the combination of Kimura and Thelander teach, wherein the system stores current user preferences and the system state information comprises whether storage input/output data are associated with current user preferences (Paragraph 48).

Claim 11 is rejected under 35 U.S.C. 103(a) as being obvious over Kimura in view of Applicants' admitted prior art.

As per dependent claim 11, Kimura teach the limitations of independent claim 1 for which dependent claim 11 depends upon.

Kimura is silent however on the use of Flash memory for the second levels of storage hierarchy.

In the Applicants' disclosure, under Background of the Invention, in paragraph 5 on page 2, the Applicants' disclose, "data that are stored on an HDD can also be temporarily stored in other media with faster read or write time to improve access performance. These media could be alternate non-volatile memory such as Flash memory ..."

Both Kimura and the claimed instant invention are analogous art because they are from the same field of endeavor of reducing power consumption within hard disk drives.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art, having both the teachings of Kimura and the Applicants' disclosure before him/her, to use Flash memory in Kimura as a form of secondary storage.

The motivation for doing so would have been, that Flash memory has a "faster read or write time" (Applicants' disclosure page 2, paragraph 5).

Therefore it would have been obvious to combine Kimura with the Applicants' disclosure for the benefit of Flash memory as a form of secondary storage to obtain the invention specified in claim 11.

Claim 12 is rejected under 35 U.S.C. 103(a) as being obvious over Kimura in view of Atkinson (U.S. 6,029,249) hereinafter referred to as Atkinson.

Kimura teach the limitations as noted supra.

Kimura does not teach counting remaining write cycles.

Atkinson teach, wherein the system state information comprises the number of remaining write cycles (Column 8 lines 48-51).

Kimura and Atkinson are analogous art because they are from the same field of endeavor, namely computer system power consumption.

At the time of invention it would have been obvious to one of ordinary skill in the art, having both the teachings of Kimura and Atkinson before him/her, to implement the counter of Atkinson into Kimura for the benefit of reducing system clock when on supplemental power to increase run time.

The motivation for doing so would have been that, a lower event count causes the frequency switching circuit to switch to a lower frequency to conserve power if the system is not already at this low frequency ... the invention allows the battery powered operating period of a computer system to be greatly extended (Column 3 lines 4-8 of Atkinson).

Therefore it would have been obvious to combine Kimura with Atkinson for the benefit of increased run time to obtain the invention as specified in claim 12.

Response to Arguments

Applicant's arguments have been carefully and fully considered but are moot in view of the new ground(s) of rejection as necessitated by amendment.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

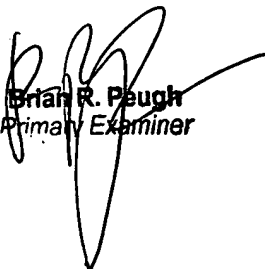
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAS/mb



Brian R. Peugh
Primary Examiner